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AUTHOR Best, Patricia A.; Brozo, William G.
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ABSTRACT

Because of the limitations of two recent major reviews of the research on studying another review of the literature was conducted. Articles chosen for this review supplied adequate information about levels of processing and encoding specificity, investigated the effects of student-generated as opposed to teacher-provided study aids on comprehension of text, utilized secondary and postsecondary level subjects, and included studies conducted since 1979 not included in the earlier reviews. A total of 16 articles found to be amenable to the analysis were grouped into categories according to the study technique investigated. The analysis revealed that most study techniques were effective when the following conditions were met: (1) the deeper the student is involved in processing textual material, the higher the payoffs in comprehension and retention; (2) the greater the degree of consistency between the processing demands of the study technique and those of the criterion task, the better the results in comprehension and retention; (3) providing adequate training in the use of the technique is critical; and (4) the more time students are engaged in processing text, the better their comprehension. (Summary tables of the research on studying are appended.) (HOD)

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College Reading and Learning Assistance

Technical Report 85-09

Current Research On Studying: A Qualitative Analysis

Patricia A. Best

Instructor

Department of Curriculum and Instruction

Northern Illinois University

DeKalb, Illinois

and

William G. Brozo

Assistant Professor

Department of Curriculum and Instruction

Northern Illinois University

DeKalb, Illinois

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CURRENT RESEARCH ON STUDYING: A QUALITATIVE ANALYSIS

As research studies in reading proliferate (Guthrie, 1983; Mosenthal, 1984; Venezky, 1977), "keeping current" has become a full-time pursuit. To save time, many of us have relied on reviews of the literature for summaries and implications of research articles. Yet this reliance is not without its trade-offs. What one gains in terms of brevity, one typically loses in terms of a full appreciation of the quality of the research because reviewers tend to give primacy to quantitative aspects, for instance whether the effect of a treatment condition achieved statistical significance (cf. Barnes & Clawson, 1975; Readence & Moore, 1980).

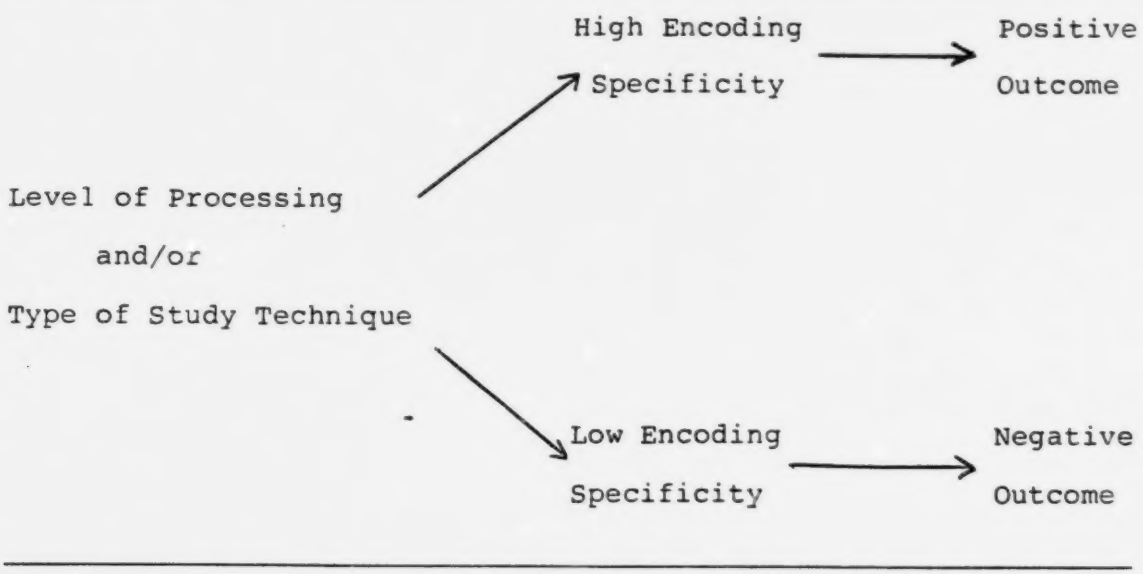
An area of reading which has received a considerable amount of research attention over the past ten years is active comprehension of text or studying. At least two recent major reviews of the studying literature have been undertaken. Both suffer from similar limitations. Rickard's (1980) literature review is so austere in its treatment of individual studies that it fails to go much beyond a mere cataloging of findings. In addition, Rickards fails to delineate exactly how articles were selected for review.

The more well-known and respected review comes from Anderson and Armbruster (1984). From a limitation standpoint, the authors, like Rickards, do not provide identifiable selection criteria for the studies reviewed. Unambiguous statements about how articles were selected are imperative, we believe, if authors

of reviews are to escape accusations of being biased, arbitrary or oblique.

The major strength of the Anderson and Armbruster review is their method of considering studying research from two very important theoretical perspectives. Studies were evaluated according to the principles of levels of processing (LOP) (Anderson, 1970), or the extent to which a study method promoted deep and meaningful involvement with the text and encoding specificity (ES) (Tulving & Thomson, 1973), or the extent to which the study method matched either the level of processing and/or the type of processing demanded of the criterion task. To clarify the relationship between these two principles, consider the following example. It has been found that when subjects trained in writing summaries were given an essay-type test as a criterion task they performed better than subjects trained in generating questions (King, Lipsky & Biggs, 1984). Because the summary writing task and the criterion task required a deep level of processing there was high encoding specificity. What is more, because summary writing and essay writing are similar types of tasks in that both require condensing, integrating and composing, there was high encoding specificity. It is possible to explain the outcomes of research on studying when the various interactions between these principles are considered (see the matrix below) but only when enough information about the level and type of processing of the study and criterion tasks is provided. The

matrix implies that (a) a study technique may require low-level processing yet produce positive results if the criterion task also requires low-level processing or if the two are similar types of tasks, and (b) regardless of the depth of processing, if it is mismatched with the criterion task, negative results are likely unless the two are similar types of tasks. Ideally, a study technique should involve the student in deep and meaningful processing of text and the student's knowledge acquisition should be measured with a task that requires a similar type and an equal level of processing. We believe these two related theoretical perspectives are critical lenses for focusing on the quality of research concerned with training students how to study text.



Based on what we have learned from past literature reviews on studying, our intent in this paper is threefold: (1) to present an updated review of the literature on studying (Anderson and Armbruster's and Rickard's reviews do not go beyond 1979); (2) to present the review in table form for ease of understanding and accessiblity, and; (3) to attempt to explain the findings of this literature as a function of the interaction of the principles of levels of processing and encoding specificity.

METHOD

Selection Criteria and Data Bases

Articles for this review were chosen on the basis of several criteria. First, articles were included in our analysis if they supplied adequate information about levels of processing and encoding specifity. Second, we were concerned about studies which investigated the effects of student-generated and not teacher-provided study aids on comprehension of text. Third, we limited our category of inclusion to research which utilized secondary and post-secondary level subjects (roughly grades 7 through college). Finally, since we were attempting to update the work of Anderson and Armbruster, research from 1979 not discussed in their review to the present was included in our review. Initially, 50 research articles were located which seemed to meet these criteria. After closer scrutiny of each article, however, a total of only 16 were found to be amenable to

our analysis and were ultimately used in the review.

Articles satisfying the above criteria were sought from the following data bases: ERIC, CIJE, Psychological and Sociological Abstracts, Dissertation Abstracts. In addition, all major reading journals and yearbooks and all relevant research and psychological journals were identified and searched.

Grouping the Studies

Studies were grouped into categories according to the study technique investigated. Most were concerned with Notetaking, and Student-Questioning. The category of Mixed Methods was created to account for studies with multiple treatments that cut across categories and included additional study techniques such as outlining, summarizing and representing text diagramatically.

Understanding the Tables

The tables presented on the following pages attempt to provide in highly accessible form a summary of key variables which may help explain research results on studying. Included in the tables are purely descriptive variables such as Author, Purpose, Subjects, Length of Training and Criterion Task. In addition, three other categories were included which offer insights into a study's quality. Expectations tries to speculate on what each research study should have found relative to the level of processing required of subjects in the use of the study technique, the type of study technique itself and the subsequent degree of encoding specifity. Findings summarizes actual results

of each study. Possible Explanations attempts to explain the degree or lack of consistency between expected and actual findings.

DISCUSSION AND CONCLUSION

Although research results are often mixed, most study technique reviewed here appear to be effective when the following conditions are met:

1. The deeper the student is involved in processing textual material, the higher the payoffs in comprehension and retention.

2. The greater the degree of consistency between the processing demands of the study technique and those of the criterion task, the better the results in comprehension and retention.

3. Providing adequate training in the use of the technique is critical. It cannot be assumed that students already possess skill in the use of a certain study method or can develop skill within a short period of time.

4. In general, the more time students are engaged in processing text, regardless of the study technique, the better their comprehension.

Ironically, even when the above conditions appeared to have been met, little research support was found for student self-questioning techniques.

This review of the studying literature provides further support for assessing the quality of research from the perspectives of levels of processing and encoding specifity. It appears, however, that a quality study goes beyond accounting for these two dimensions. The most exemplary among them provided adequate time for training students in the use of a given study technique and made provisions for determining whether students actually mastered the technique before assessment. Implied here is the idea that many study techniques which were found to be ineffective might have produced salutory effects if students were given plenty of training time so as to ensure mastery and were given adequate time on the actual criterion task to demonstrate mastery. We can only urge that in the future, researchers take into account in the design of their studies and practitioners incorporate within their instructional paradigms these variables which appear to be critical determinants of the success of a given study technique.

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Appendix

Summary Tables of Research on Studying

Author	Purpose of Study	#Subjects and level	Training in Technique	Criterion Task	Expectations	Findings	Possible Explanation
Brozo, Stahl, Gordon	To determine the comparative effects of instruction in summarizing, question-writing and question/answer relations on reading comprehension test performance	49/ College	Yes 4-5 hours per week for 4 weeks	2 tests were administered 1. a "practice" reading comp. test consisting of 10 passages and 58 multiple-choice questions 2. The "actual" statewide reading comprehension test which was similar to the first test	Question-writing and question/answer relations group should outperform summarizing group because LOP matches demands of criterion task and because type of study technique matches criterion task	The question/answer relations group did score significantly higher on practice reading test and The question/answer relations group and the question-writing group performed higher than summarizing group on actual test	High ES Student knowledge of criterion task during taking of actual test (due to practice test) is also a factor in positive results.
King, Biggs, Lipsky	To compare effectiveness of pre-reading self-questioning and post-reading summarizing on comprehension and recall	87/ College	Yes 2 class periods of instruction and practice of techniques	1. free-recall test 2. objective test (T-F, multiple-choice and short answer) 3. essay test	Summarizers should perform well on free recall and essay test because high LOP matches demands of criterion task Question-generators should perform well on objective test because type of study technique matches criterion task	On free recall summarizer did significantly better than other 2 groups on task On objective test, both question-generators and summarizers did better than control	High LOP & high ES High ES for question/generators
Bean, et al	To compare effect of and Ss attitude toward instruction in summarizing and in constructing graphic organizers on comprehension of history concepts when compared to a control group that constructed traditional outlines.	72/ 10th grade	Yes Over a 14-week instructional period	6 multiple-choice quizzes given over the 14-week period	Summarizing and graphic organizer groups should not outperform control group because the high LOP does not match the demands of the criterion task and the type of study technique does not match criterion task	Trained groups did no better than control groups on 5 out of 6 quizzes However, group 1 scored high on a later summarization exercise	Low ES High ES

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Author	Purpose of Study	#Subjects and level	Training in Technique	Criterion Task	Expectations	Findings	Possible Explanation
Johnson	To study the effects of narrative schema training and question-generation on reading comprehension	81/ 7th grade	Yes 2 40 min. sessions & 5 days of practice 40 min. per day (2 groups were trained, 2 groups received no training)	2 narrative selections with 10 comprehension questions each	Expect trained question-generators to perform better than untrained question-generators because type of study technique matches demands of criterion task	No significant effect for schema-training and/or for question generating However, trained & untrained Ss who received instructor-provided questions did better on post-test	Possibly because 7th grade subjects did not generate the "right" questions for criterion task. Probably the post-test questions were similar to the "instructor-provided" questions
Garner and Alexander	To ascertain if proficient readers spontaneously demonstrate a question-formulation strategy. Also, does this question-formulation group have better comprehension than readers who do not demonstrate a question-formulation strategy.	30/ College	No	Recall/1 question (not inference) was posed immediately after reading	Ss who anticipate question to be asked should outperform others because type of study technique matches criterion task. There is also a higher LOP involved in question-generation	The 15 Ss who generated questions scored significantly higher than the non-question generators.	High LOP High ES
Singer and Donlan	To examine whether readers could learn a generic self-questioning technique and if they could evolve story specific questions and if use of the technique would improve comprehension of story content as compared to a group that received teacher-posed questions	27/ College	Yes over a 3-week period using 6 short stories	10-item multiple-choice questions for each story based on kind of questions students were taught to generate	Question-generators should outperform other groups because of high LOP and because type of study technique matches criterion task.	On 4 out of 6 short stories, question-generators scored consistently higher than those receiving teacher-posed questions	High LOP and High ES Criterion task items were based on some knowledge structures students were trained to use. Therefore, post-test questions were similar to student-generated ones

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Author	Purpose of Study	#Subjects and level	Training in Technique	Criterion Task	Expectations	Findings	Possible Explanations
Santa, Abrams and Santa	To measure the effectiveness of restricted and unrestricted notetaking on recall. Also compared the "encoding" function of notes to the "storage review" function of notes	160/ College	No	10 item multiple-choice test for immediate and 1-week delayed recall Also immediate free recall of main ideas and immediate free recall of details	Unrestricted notetakers should do better on multiple choice test and details, because low level of processing matches demands of criterion task. Restricted notetakers should do better on main idea test because high level of processing matches demands of criterion task.	Notetakers of any kind did no better than control on multiple choice Notetakers of any kind did no better than control group on main ideas Both notetaking groups especially "unrestricted" did better than control on details.	Because there was no training in technique and no evaluation of notes, itis not possible to say if "good" notes were taken Unrestricted group had high ES for test of details
Orlando	To determine if student's intentions while notetaking (encoding purpose or external storage purpose) had effect on immediate & delayed recall	60/ College	No	20 question open-ended factual tests given immediately and 1 week delayed	External storage notetakers should do better on factual test because lower LOP matches demands of criterion task Encoding notetakers should not do well because the higher LOP does not match demands of criterion task	External storage groups did not outperform encoding group Encoding group did outperform external storage group	It is possible that over-reliance on external storage (construction of a "good" set of notes) interferred with processing of information

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College Reading and Learning Assistance Technical Reports
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Technical Report No.	
84-01	Brozo, W. G., Schmelzer, R. V., & Spires, N. A. A Study of Test-Wiseness Clues in College/University Teacher-Made Tests with Implications for Academic Assistance Centers. (ERIC Document Reproduction Service No. ED 240-928)
84-02	Stahl, N. A., Brozo, W. G., & Henk, W. A. Evaluative Criteria for College Reading-Study Research. (ERIC Document Reproduction Service No. ED 240-933)
84-03	Schmelzer, R. V., Brozo, W. G., & Stahl, N. A. Using a Learning Model to Integrate Study Skills into a Peer-Tutoring Program. (ERIC Document Reproduction Service No. ED 256-244)
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84-08	Brozo, W. G., & Schmelzer, R. V. Faculty Perceptions of Student Behaviors: A Comparison of Two Universities. (Not submitted to ERIC--to appear in an upcoming edition of the Journal of College Student Personnel)

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85-05 Henk, W. A., & Stahl, N. A. A Meta-Analysis of the Effect of Notetaking on Learning from Lecture. (ERIC Document Reproduction Service No. ED 258-533)

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